*Potential bioterrorism agent: Category B*

# BRUCELLOSIS

## DISEASE REPORTING

### *In Washington*

DOH receives 0 to 3 reports of brucellosis per year.

Washington was declared free of bovine brucellosis in 1988; cases occurring in Washington residents usually result from out-of-state or international exposures, including contact with animal tissues or ingestion of raw dairy products.

### *Purpose of reporting and surveillance*

- To identify rare diseases associated with travel.
- To assist in the diagnosis and treatment of cases.
- To identify potentially exposed health care workers or laboratory personnel and to provide counseling.
- To identify sources of transmission *(*e.g., an infected animal or a contaminated unpasteurized dairy product) and to prevent further transmission from such sources.
- To raise the index of suspicion of a possible bioterrorism event if no natural exposure source is identified.

### *Reporting requirements*

- Health care providers: **immediately notifiable to Local Health Jurisdiction**
- Hospitals: **immediately notifiable to Local Health Jurisdiction**
- Laboratories: notifiable to Local Health Jurisdiction within 2 workdays; specimen submission required
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days. ***If bioterrorism is suspected, case must be immediately reported to DOH: 1-877-539-4344***

## CASE DEFINITION FOR SURVEILLANCE

### *Clinical criteria for diagnosis*

An illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

### *Laboratory criteria for diagnosis*

- Isolation of *Brucella* sp. from a clinical specimen, or
- Fourfold or greater rise in *Brucella* agglutination titer between acute- and convalescent-phase serum specimens obtained ≥ 2 weeks apart and studied at the same laboratory, or
- Demonstration by immunofluorescence of *Brucella* sp. in a clinical specimen.

### *Case definition*

- Probable: a clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (i.e. *Brucella* agglutination titer of ≥ 160 in one or more serum specimens obtained after onset of symptoms).
- Confirmed: a clinically compatible case that is laboratory confirmed.

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## A. DESCRIPTION

### *1. Identification*

A systemic bacterial disease with acute or insidious onset, characterized by continued, intermittent or irregular fever of variable duration; headache; weakness; profuse sweating; chills; arthralgia; depression; weight loss and generalized aching. Localized suppurative infections of organs, including the liver and spleen, may occur; subclinical disease has been reported, and chronic localized infections can occur. The disease may last for several days, months or occasionally a year or more if not adequately treated.

Osteoarticular complications are seen in 20%-60% of cases; sacroiliitis is the most frequent joint manifestation. Genitourinary involvement is reported in 2%-20% of cases, with orchitis and epididymitis most common. Recovery is usual but disability is often pronounced. The case-fatality rate of untreated brucellosis is 2% or less and usually results from endocarditis caused by *Brucella melitensis* infections. Part or all of the original syndrome may reappear as relapses. A neurotic symptom complex is sometimes misdiagnosed as chronic brucellosis.

Laboratory diagnosis is made by appropriate isolation of the infectious agent from blood, bone marrow or other tissues, or from discharges of the patient. Serologic tests in experienced laboratories are valuable, especially when paired sera show a rise in antibody titer. Interpretation of serologic tests in chronic and recurrent cases is especially difficult since titers are usually low. Tests measuring immunoglobulin G (IgG) antibody may be useful, particularly in chronic cases, since active infection is associated with a titer rise. Specific serologic techniques are needed for *B. canis* antibodies, which do not cross react with the other species.

### *2. Infectious Agent*

*Brucella abortus*, biovars 1-6 and 9; *B. melitensis*, biovars 1-3; *B. suis*, biovars 1-5; and *B. canis*.

### *3. Worldwide Occurrence*

Worldwide, especially in Mediterranean countries of Europe and North and east Africa, Middle Eastern countries, India, central Asia, Mexico, and Central and South America. The sources of infection and the responsible organism vary according to geographic area. Brucellosis is predominantly an occupational disease of those working with infected animals or their tissues, especially farm workers, veterinarians and abattoir workers; hence it is more frequent among males. Sporadic cases and outbreaks occur among consumers of raw milk and milk products (especially unpasteurized soft cheese) from cows, sheep and goats. Isolated cases of infection with *B. canis* occur in animal handlers from contact with dogs. Currently reported incidence in the US is less than 120 cases annually; worldwide, the disease is often unrecognized and unreported.

### *4. Reservoir*

Cattle, swine, goats and sheep. Infection may occur in bison, elk, caribou and some species of deer. *B. canis* is an occasional problem in laboratory dog colonies and kennels; a small percentage of pet dogs and a higher proportion of stray dogs have positive *B. canis* antibody titers. Coyotes have been found to be infected.

### *5. Mode of Transmission*

By contact with tissues, blood, urine, vaginal discharges, aborted fetuses and especially placentas (through breaks in the skin), and by ingestion of raw milk and dairy products (unpasteurized cheese) from infected animals. Airborne infection of animals occurs in pens and stables, and of humans in laboratories and abattoirs. A small number of cases result from accidental self-inoculation of strain 19 *Brucella* vaccine; the same risk is present when Rev-1 vaccine is handled.

### *6. Incubation period*

Highly variable and difficult to ascertain; usually 5-60 days; 1-2 months commonplace; occasionally several months.

### *7. Period of communicability*

No evidence of communicability from person to person.

### *8. Susceptibility and resistance*

Severity and duration of clinical illness are subject to wide variation. Duration of acquired immunity is uncertain.

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## B. METHODS OF CONTROL

### *1. Preventive measures:*

a. Educate the public (especially tourists) not to drink untreated milk or eat products made from unpasteurized or otherwise untreated milk.
b. Educate farmers and workers in slaughterhouses, meat processing plants and butcher shops as to the nature of the disease and the risk in the handling of carcasses and products of potentially infected animals, and the proper operation of abattoirs to reduce exposure (especially appropriate ventilation).
c. Educate hunters to use barrier precautions (gloves, clothing) in dressing feral swine and to bury the remains.
d. Search for infection among livestock by serologic test and by ELISA or ring test of cows' milk; eliminate infected animals by segregation and/or slaughter. Infection among swine usually requires slaughter of the herd. In areas of high prevalence, immunize young goats and sheep with live attenuated Rev-1 strain of *B. melitensis*, and calves and sometimes adult animals with strain 19, *B. abortus*. Since 1996, the recombinant RB51 vaccine has largely replaced the use of strain 19 for immunization of cattle against *B. abortus*. RB51 vaccine appears to be less virulent for humans than strain 19.
e. While evidence for its efficacy has not been proven in clinical trials, it is recommended that persons inadvertently inoculated with strain 19 or Rev-1 vaccines be given doxycycline 100 mg twice daily, combined with rifampin 600-900 mg once daily for 21 days; for conjunctival inoculations, prophylaxis should be maintained for 4-6 weeks.
f. Pasteurize milk and dairy products from cows, sheep and goats. Boiling milk is effective when pasteurization is impossible.
g. Exercise care in handling and disposal of placenta, discharges and fetus from an aborted animal. Disinfect contaminated areas.

### *2. Control of patient, contacts and the immediate environment:*

a. Report to local health authority.
b. Isolation: Draining and secretion precautions if there are draining lesions; otherwise none.
c. Concurrent disinfection: Of purulent discharges.
d. Quarantine: None.
e. Immunization of contacts: None.

f. Investigation of contacts and source of infection: Trace infection to the common or individual source, usually infected domestic goats, swine or cattle, or raw milk or dairy products from cows and goats. Test suspected animals and remove reactors.
g. Specific treatment: A combination of rifampin (600-900 mg daily) or streptomycin (1 g daily), and doxycycline (200 mg daily) for at least 6 weeks is the treatment of choice. In severely ill, toxic patients, corticosteroids may be helpful. If possible, tetracycline should be avoided in children less than 7 years old to avoid tooth staining. TMP-SMX is effective, but relapses are common (30%). Relapses occur in about 5% of patients treated with doxycycline and rifampin and are due to sequestered rather than resistant organisms; patients should be retreated with the original regimen. Arthritis may occur in recurrent cases.

### *3. Epidemic measures*

Search for common vehicle of infection, usually raw milk or milk products, especially cheese, from an infected herd. Recall incriminated products; stop production and distribution unless pasteurization is instituted.

### *4. International measures*

Control of domestic animals and animal products in international trade and transport. WHO Collaborating Centres.